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Optical absorption of KZnF3:Tl+ and KMgF3:Tl+ crystals

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Abstract

The absorption spectra of KZnF3:Tl+ and KMgF3:Tl+ crystals have been measured over the energy range 1.5-6.4 eV at temperatures of 10-300 K. A wide absorption band with a clear doublet structure identified as an absorption A band of Tl+ impurity centres is observed for both crystals. The position of the band, its bandwidth and the distribution of absorption intensity between the two components of the band are temperature dependent in the range T > 65 K. All features of the absorption spectra of the crystals studied are explained within the frameworks of the conventional theory on the basis of the Frank-Condon principle and the semiclassical picture of crystal lattice vibrations. The band shapes calculated by the Monte Carlo method are in satisfactory agreement with observed ones.

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